DOCUMENT RESUME

ED 310 055 SO 020 208

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TITLE A Report Card on the Economic Literacy of U.S. High School Students.
INSTITUTION Joint Council on Economic Education, New York, N.Y.
PUB DATE 88
NOTE 15p.; For related document, see SO 020 207.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; *Economics; *Economics Education; High Schools; Pretests Posttests; Scores; Social Studies; *Teacher Education; *Teacher Qualifications; *Test Interpretation
IDENTIFIERS Developmental Economic Education Program; Economic Awareness; *Economic Concepts; Joint Council on Economic Education; Macroeconomics; Microeconomics; *Test of Economic Literacy

ABSTRACT

A study of over 3,000 U.S. high school students who took the Test of Economic Literacy (TEL) in 1986 reveals a lack of basic understanding in the four basic TEL concept clusters of fundamental economics, microeconomics, macroeconomics, and international economics. The TEL was administered pre- and posttest where students were enrolled in one of four types of courses: basic economics, "consumer economics," social studies with economics, and social studies without economics. Students in the economics courses did show significant improvement (+7.5 percent) after the TEL posttest examination while the others did not. Regression analysis was used to identify the effects of variables such as student background and environment or teacher and course preparation. Students in districts which participated in the Developmental Economic Education Program (DEEP) sponsored by the Joint Council on Economic Education scored higher than other students. The amount of college coursework in economics taken by the teachers themselves directly related to increased student performance in the classroom. A significant amount of ignorance was displayed in basic concepts and relationships in macroeconomics and international economics. Three tables of TEL data and 12 references are included in the report. (PPB)

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A Report Card on the Economic Literacy of U. S. High School Students*

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SO020208

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*This report has not been publicly issued, except in a mid-year 1988 issue of The American Economic Review, and periodic JCEE membership briefing papers.

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A Report Card on the Economic Literacy of U.S. High School Students

William B. Walstad and John C. Soper*

In the 1980's, assessment and critique of American education has taken center stage. A large segment of the public is upset with the educational achievement of precollege students in several content areas. Economics should now be added to the list of failing subjects because the results of our study show a poor performance by many high school students in their knowledge of basic economic concepts.

The study is based on a large, national sample of students who took the second edition of the Test of Economic Literacy (TEL) (Soper and Walstad, 1987). The TEL is a nationally normed and standardized test of the basic economic understanding of students in eleventh and twelfth grade, consisting of two forms of 46 multiple-choice questions. The test questions were based on A Framework for Teaching the Basic Concepts (Saunders, et. al., 1984). This content guide describes 22 basic economic concepts in four concept clusters - fundamental, microeconomic, macroeconomic, and international - that should be taught in secondary schools to enable students, "by the time they graduate from high school, to understand enough economics to make reasoned judgments about economic questions" (p. 1).

Although economic literacy can be defined and measured in different ways (Stigler, 1970; Hansen, 1977), data from the norming of the TEL provide a comprehensive assessment of the economic literacy of U.S. high school students. The TEL was administered as a pretest to 6,570 students in January, 1986. Another 8,205 students took the TEL as a posttest in May, 1986. Combining the two data sets produced a representative, national sample of 3,031 cases where students had taken the TEL as both a pre- and a posttest in one of four courses. This student group will be used for the analysis so that changes in economic literacy across different types of courses can be examined.

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Students were classified by type of course based on information from a teacher survey. Of the matched pre- and posttest sample, 50 percent were taking an economics course that used a published high school economics text and focused instruction on basic economic concepts. Students taking courses designated by the teacher as "consumer economics" were 19 percent of the sample. The remaining 31 percent of the students were taking various social studies courses, such as U.S. history or government: 15 percent took social studies courses from teachers who reported including economics in the course; 16 percent took a social studies course without any economics instruction.

I. TEL Item Performance

The mean percent correct on all the unique TEL items by the type of course are reported in Table 1. (For the sake of parsimony, the 46 items on each form were combined and the 15 items that were common to each form were counted only once to produce one 77-item test. The findings from the merged test directly mirror those for each form.) The mean posttest level of economic literacy varies substantially for students in different courses. Students in social studies courses whose teacher does not include economics can correctly answer only 37 percent of the questions, or just 12 percent over a chance level on a four-option multiple choice test. The performance of students in consumer economics courses at 40 percent correct is only slightly better. Students in social studies courses where the teacher includes economics score 48 percent correct, and economics students score 52 percent correct. Under the most liberal grading standards, and even considering the fact that the TEL was designed as a normed achievement test, these posttest scores would be classified as failing.

Subtest analysis was also conducted by calculating the mean percent correct for the posttest in each of the four major concept clusters defined in the Framework. The worst levels of performance are on macroeconomics and international economics items. For example, economics students score 47 percent correct on macroeconomic items and 48 percent correct on international items compared to 58 percent correct

on fundamental items and 56 percent correct on microeconomic items. The results are similar for other courses. Students show about 6-10 percent less knowledge of macroeconomic and international concepts than they do of fundamental and microeconomic concepts. Weak performance in these key economic clusters is directly contributing to the failing grades on the overall test.

A more positive picture can be painted when the change from the pre- to posttest is examined, at least for students in the economics course. Economics students show a 7.5 percent improvement in the overall percent correct. Most of this gain comes from the increased understanding of fundamental concepts (+11 percent) versus the other concept clusters (+6-7 percent). In contrast, there is essentially no change in economic understanding in the other courses. Students in these courses show slight gains in understanding of fundamental items, but this gain is offset by slight declines in knowledge of microeconomic, macroeconomic, and international economic concepts. Consumer economics and social studies courses do not contribute much to economic literacy and are not effective substitutes for a separate course in economics as a means of increasing economic understanding.

Data are presented in Table 2 on the comparative performance of just the economics students on the economic concepts that form the four concept clusters. Concepts with the best scores, (+60-75 percent correct) are, with the exception of unemployment, from the fundamental and microeconomic clusters and include: economic systems; economic institutions and incentives; money and exchange; and, supply and demand. Average performance (52-59 percent correct) is shown with such fundamental or microeconomic concepts as, scarcity, opportunity cost/trade-offs, productivity, markets and prices, competition and market structure, government, and with two macroeconomic concepts, GNP and aggregate demand. The lowest scores (+35-49 percent correct), with the exception of the low item score on market failure, are reserved exclusively for macroeconomic and the international items: aggregate supply; inflation; monetary policy; fiscal policy; comparative advantage and trade barriers; balance of payments and exchange rates; and, economic growth.

II. Regression Models and Results

Regression analysis of the overall TEL scores was conducted to identify factors that contributed to economic understanding. The analysis was necessary to control for the effects of any background variables that might not be accounted for in the item analysis. It could be claimed, for example, that one reason that students in an economics course performed better than students in other courses was because students in those courses were more intelligent or from higher income levels than the group of students in the other courses.

"Absolute level" and "absolute improvement" models (Siegfried and Fels, 1979, p. 929) were specified for the analysis. The first model examines factors that contribute to the stock of economic understanding. It has been used in several previous national studies of high school economics (Walstad and Soper, 1982; Soper and Brenneke, 1981; and, Bach and Saunders, 1964). The second model measures the flow of learning that occurs from a pretest to a posttest by including the pretest as a regressor. The availability of matched pre- and posttest data permitted us to estimate this model with a large, national sample of high school students for the first time in economic education research.

The variable labels, means, and standard deviations for the regressions are presented in the first column of Table 3. The TEL posttest score was the dependent variable in each equation. The TELPRE variable in equation 2 was the pretest TEL score. Rather than duplicate the analysis for each form of the TEL, raw scores on form A of the TEL were equated to the raw scores on form B using a linear equating formula (Angoff, 1984, p. 101). Each equation was estimated using the equated scores. Student IQ was estimated with scores on the Quick Word Test (Borgatta and Corsini, 1964) that was administered at the same time as the posttest TEL. Student data were also used to construct dummy variables (1=yes; 0=no) to capture the effects of class rank (SENIOR), gender (MALE), and race (BLACK).

Three factors were included in the model that have policy implications for economics instruction in senior high schools. First, course type differences were

captured by three dummy variables, one for an economics course (ECON), one for a consumer economics course (CONECON), and one for a social studies course with economics (SSECON). The omitted category was a social studies course without economics instruction. Second, the influence of the economics human capital of the teacher was measured by the number of credit courses in economics that each student's teacher had taken (TCOUR). Third, information was collected on the degree of school district involvement in teacher training and curriculum development through the Developmental Economic Education Program (DEEP) sponsored by the Joint Council on Economic Education (Maher, 1969). It was anticipated that students in DEEP districts that had implemented and sustained the program would outperform students in non-DEEP districts.

The remaining variables control for other background and environmental factors that might influence economic knowledge and learning. The estimated income of students in a class was represented by two dummy variables, one for high income (HINCOME) and one for middle income (MINCOME), with the excluded income class being low income. The size of the school (SIZE) in which the course was taught was included in the model, but transformed to common logs to correct for skewness in the distribution. The type of community in which the school was located was controlled for by two dummies, one for an urban (URBAN), and one for a suburban (SUBURB) location, with the rural location serving as the excluded group. The census region for the school was captured by dummy variables representing the northeast region (NEAST), the southern region (SOUTH) and the western region (WEST), with the north central region serving as the comparison group.

The results from estimating equations by OLS are provided in columns 2 and 3 of Table 3. All other things equal, the type of course a student takes has a significant effect on the level of economic knowledge in equation 1. Students who have completed an economics course score 4.1 points higher on the TEL than social studies students whose teachers do not include economics instruction in their courses. Social studies students whose teachers do include economics instruction in

their courses score 2.4 points higher on the TEL. Students in a consumer economics course score about the same as students taking a social studies course without economics. These posttest rankings are similar to the results for the mean percent in Table 1.

As shown in equation 2, economics instruction also makes a contribution to the posttest score beyond that explained by TELPRE and the other variables. ECON students show a highly significant increase in knowledge by 3.8 points when compared with students taking a social studies course without economics instruction. SSECON students show a slight gain of 1 point on the TEL relative to students in the no-economics social studies course. Students in consumer economics courses learn no more economics than students taking a social studies course whose teacher does not include economics in the instruction. Obviously, the direct approach through a separate course makes the most significant contribution to economics learning, although the integration of economics in a social studies course may be somewhat helpful.

Teacher coursework in economics improves the economic knowledge of students. In equation 1, each college-credit economics course that a teacher has taken adds .64 of a point to the predicted TEL score. Moreover, the more education a teacher has in economics, the more student learning of the subject increases. Even after accounting for the influence of the pretest knowledge in equation 2, each course a teacher has taken still adds .41 of a point to student knowledge. These results provide further support for the value of teacher education in economics as a means of improving the economic literacy of high school students.

The DEEP variable is a significant predictor of economics achievement and contributes to gains in economic knowledge. Students in DEEP districts, which provide teacher in-service education in economics and which build economics into the curriculum, score 1.6 points higher on the TEL than students in non-DEEP districts. The contribution from DEEP does not disappear when the pretest variable is included in equation 2 because there is still a 1.4 point difference in economic knowledge in

favor of students in DEEP districts. The reasons for this effect are difficult to identify, but DEEP participation probably helps teachers by giving them access to curriculum materials, consulting assistance, and in-service education. These benefits, in turn, get incorporated into classroom instruction for students. DEEP is supposed to work that way and these results suggest that it does make a contribution to knowledge and learning.

The findings from the other variables will not be discussed because of space constraints and because most of these variables are not subject to policy changes. We now turn to the implications of these results for improving economic literacy in the nation's high schools and for teaching economics in college.

III. Implications

Based on the test and regression analyses, we would recommend that several actions be taken in school districts to reduce the economic illiteracy of high school graduates. All high school students, whether job market or college bound, should take a separate course in economics because this course is the only reliable way to make significant gains in economic knowledge. There is some movement in this direction across the nation because at least 15 states now require a course in economics for high school graduation (Brennan, 1986, p. 20-1). Infusing economics into a social studies course may help, but it should not replace direct instruction in the subject; consumer economics may teach students about other topics that are not measured by the TEL, but that course does not add to economic knowledge.

The high school economics courses should devote more time to the study of macroeconomics and international economic concepts. Economics courses now do their best job in teaching students about fundamental economics and related concepts of scarcity, economic systems, economic institutions and incentives, and money and exchange. They even develop some understanding of the rudiments of supply and demand. However, high school economics students show an appalling amount of ignorance of basic concepts and relationships in macroeconomics and international economics which has nothing to do with theoretical disputes in the economics

profession. Either economic concepts in these areas are not taught, or if they are taught, economics teachers do a poor job of providing instruction.

This last point raises another concern about the economic knowledge of teachers. The results clearly indicate that the more education in economics a teacher has, the better the students do and the higher the level of achievement. Teachers need to be encouraged to take more coursework in the ever changing field of economics if they are to stay current. One way to do this would be for a school district to make a stronger commitment to economic education through DEEP. Additional economic education provided to teachers through DEEP should also be supplemented with the creation of more curriculum materials and with more training in the use of the materials in the classroom. The preparation of new instructional materials on macroeconomics and international economics should increase knowledge of these topics.

Our findings suggest that significant improvements in the economic literacy of U.S. high school students will be made when students take an economics course, from teachers who have taken many economics courses and who teach macroeconomics and international economics, and in a school district that has made a substantive commitment to economic education. Aside from personal, environmental, and demographic variables over which there is little control, these factors significantly influence the level of economic knowledge and increase economic learning. Until these changes are made, college instructors can safely assume that high school graduates who enter introductory economics courses are sadly deficient in their knowledge of basic economic concepts and relationships - a situation college instructors will have to correct. But the majority of high school graduates never go to college, and even when they do, they may not take a course in economics. Without solid education in high school economics, most adults will never have a chance of becoming literate in economics.

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Table 1: Percent Correct on TEL

Course & Items	Pre	Post	Change
Economics [1,499 cases]			
All Items (77)	44.9%	52.4%	7.5%
Fundamental (20)	47.0	58.4	11.4
Microeconomics (20)	48.6	55.5	6.9
Macroeconomics (23)	41.0	46.5	5.5
International (12)	42.2	47.9	5.7
Consumer economics [579 cases]			
All Items (77)	40.3	40.1	-0.2
Fundamental (20)	42.9	45.6	2.7
Microeconomics (20)	44.5	43.4	-1.1
Macroeconomics (23)	35.9	33.6	-2.3
International (12)	36.7	37.6	0.9
Social studies with economics [456 cases]			
All Items (77)	47.7	47.7	0.0
Fundamental (20)	49.4	50.4	1.0
Microeconomics (20)	53.4	52.0	-1.4
Macroeconomics (23)	42.2	42.6	0.4
International (12)	45.5	45.0	-0.5
Social Studies without economics [497 cases]			
All Items (77)	37.4	36.9	-0.5
Fundamental (20)	39.7	41.9	2.2
Microeconomics (20)	40.9	39.6	-1.3
Macroeconomics (23)	33.4	31.9	-1.5
International (12)	35.0	32.9	-2.1

Note: Number of items is in parentheses.

Table 2: Percent Correct for Economics Course

Clusters & Concepts	Pre	Post	Change
Scarcity (3)	38.6%	53.5%	14.9%
Opp. Cost/Trade-offs (5)	42.6	52.2	9.6
Productivity (3)	45.7	52.3	6.6
Economic Systems (1)	62.8	75.0	12.2
Econ. Inst./Incent. (5)	51.1	63.4	12.3
Exc./Money/Interdep. (3)	52.2	64.5	12.2
Markets & Prices (2)	49.1	54.3	5.2
Supply & Demand (7)	52.2	61.0	8.8
Compet. & Struct. (4)	56.5	57.5	1.0
Income Distribution (3)	45.2	50.4	5.2
Market Failures (3)	34.2	42.6	8.4
Role of Government (3)	47.9	55.7	7.8
Gross Nat. Product (2)	52.1	59.0	6.9
Aggregate Supply (2)	38.8	45.4	6.6
Aggregate Demand (3)	47.0	54.9	7.9
Unemployment (2)	58.7	63.9	5.2
Inflation/Deflation (4)	32.8	35.3	2.5
Monetary Policy (5)	29.5	38.3	8.8
Fiscal Policy (5)	44.7	47.0	2.4
Comp. Adv./Trade (5)	46.2	51.8	5.6
Bal. Pay./Exc. Rates (4)	40.6	45.0	4.4
Economic Growth (3)	37.5	45.2	7.7

Note: Number of items is in parentheses.

Table 3: TEL Regression Results (N=2,483)

	Eq. 1	Eq. 2
Dep. Var. = TEL [22.14; 8.98]#		
CONSTANT	-17.782 (8.025)+	-17.399 (9.084)
TELPRE [20.34; 7.45]	---	0.536 (28.905)**
IQ [59.56; 15.12]	.295 (31.459)**	0.175 (19.194)**
MALE [.51; .50]	1.345 (5.169)**	0.520 (2.296)*
SENIOR [.58; .49]	1.340 (4.430)**	0.599 (2.280)*
BLACK [.10; .30]	-1.633 (3.548)**	-0.871 (2.184)*
ECON [.54; .50]	4.128 (10.316)**	3.821 (11.043)**
CONECON [.15; .35]	-0.109 (0.219)	-0.121 (0.283)
SSECON [.12; .33]	2.435 (4.472)**	1.034 (2.185)*
TCOUR [4.23; 2.28]	.639 (8.321)**	.408 (6.111)**
DEEP [.43; .495]	1.633 (4.829)**	1.408 (4.815)**
SIZE [3.06; .23]	4.645 (6.778)**	4.236 (7.150)**
MINCOME [.76; .43]	2.287 (4.704)**	1.346 (3.195)**
HINCOME [.14; .35]	1.958 (3.145)**	0.334 (0.618)
SUBURB [.47; .50]	-0.329 (0.863)	-0.228 (0.691)
URBAN [.21; .41]	-1.037 (2.515)*	-0.897 (2.516)*

Table 3 (Continued)

	Eq. 1	Eq. 2
NEAST	-1.619	-0.218
[.14; .34]	(3.770)**	(0.584)
SOUTH	-0.829	-1.042
[.40; .49]	(2.494)**	(3.627)**
WEST	-0.634	-0.278
[.12; .32]	(1.105)	(0.560)
$\bar{R}$-square	.488	.618
SEE	6.424	5.552

* Significant at the .05 level.

** Significant at the .01 level.

[variable mean; standard deviation]

+ (absolute value of the t-statistic)